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II

Glaciological and Marine Biological Studies at
Perimeter of Dronning Maud Land, Antarctica

Investigation No. 28550

Report

from

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NORWAY

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INTRODUCTION

The overall objective of this investigation is to utilize LANDSAT imagery to analyze changes in the Dronning Maud Land coastline and to obtain statistical data on ocean dynamics, plankton distribution, and sea ice and iceberg distribution in this region of Antarctica.

PROBLEMS

Until recently the overriding problem with this investigation was lack of data. Prior to 25 February this year only two scenes of the test area had been received, and little progress had been made. However, on that date 16 scenes were received, and a further 23 scenes arrived on 15 March. These cover LANDSAT-2 imagery obtained up to 20 December 1975, and analyses of all these are now in full progress.

RESULTS

Coast line

The map, Fig. 1, shows the Antarctic coast line from 2°W to 25°E determined from LANDSAT imagery, and a comparison with former mapping. The LANDSAT coastline determination is based on imageries Nos. 2267-06220, 2270-06385, 2278-07250, 2278-07244, 2279-07305, 2281-07421, and 2281-07415, received here last month, and imageries Nos. 2302-06160, 2305-08168, 2308-06495, 2308-06502, and 2318-07014, received here last week. The map has been made at scale of 1:1,000,000, and the imageries have been positioned by use of rock outcrops of known positions. The former mapping is based on airphotography mostly from 1951/52 and 1958/59 with limited ground control, and exists mostly as unpublished maps here at Norsk Polarinstitutt. Some of the differences in coast line shown in Fig. 1 may be due to errors in the earlier mapping, or in positioning of the LANDSAT imagery. However, the major changes are real. The LANDSAT map, Fig. 1, must be regarded as preliminary. When all imageries from the 1975/76 austral summer are available here then we will select the best imagery for each part of the coast and produce a map at scale of 1:500,000.

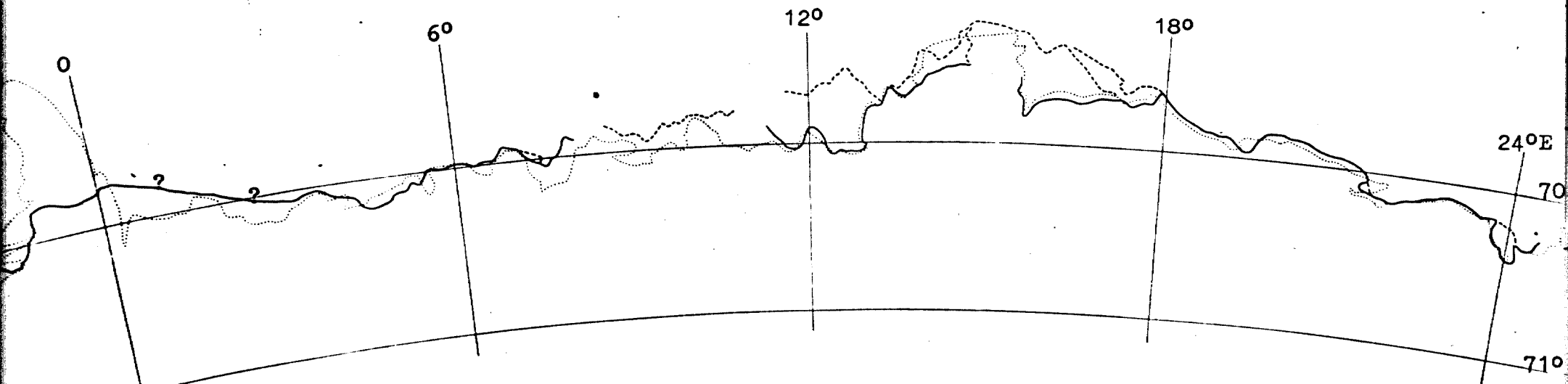
Sea ice

The imageries 2278-07250 and 2281-07415 were favourable for determination of drift velocities and divergence in the sea ice field. It was possible to determine the displacement of seven floes over the three day period. The drift velocities of the centers of the floes varied between 9 and 13 km/24 h, with an average of 10 km/24h. The floes drifted westwards near the coast between 3° and 5°E. There was a convergence in the field during the period amounting to $1.0 \times 10^{-5} \text{sec}^{-1}$. These first data on ice drift in this investigation shows velocities which are within the range found in the Svalbard area in connection with investigation No. 28540.

Plankton

Inspection of the imagery including use of an I²S "Ad-col" viewer has not revealed any noticeable plankton or krill sheets in the imageries hitherto studied. This is not unexpected, as the imageries received by us this year have comprised open water imagery only from October and November. We know that the great amassment of plankton is a midsummer phenomenon, and so we need to study December and January imageries of open water. We trust such imagery will be forthcoming.

DRONNING MAUD LAND, ANTARCTICA



Solid line = Coast line determined from LANDSAT imagery

Dotted line = Coast line determined mostly from Norsk Polarinstitut's 1951/52 and 58/59 air photography

Dashed line = Outer limit fast ice at time of photography/imagery

Scale:

